WHAT IS CLAIMED:

1. A method for identifying a compound that modulates a tissue protective activity, comprising:

(a) contacting a test compound with a tissue protective cytokine receptor complex;

(b) measuring the level of tissue protective cytokine receptor complex activity;

(c) identifying a test compound which increases or decreases the level of tissue protective cytokine receptor complex activity as compared to the level of tissue protective cytokine receptor complex activity measured in the absence of the test compound; and

(d) assaying the identified test compound for tissue protective activity.

2. The method of claim 1 wherein the tissue protective cytokine receptor complex activity is measured by measuring the binding of the test compound to the tissue protective cytokine receptor complex.

3. The method of claim 2, wherein the test compound is labeled and binding of the labeled test compound to the tissue protective cytokine receptor complex is measured by detecting the label attached to the test compound.

4. The method of claim 2 wherein the tissue protective cytokine receptor complex activity is measured by measuring the binding of the test compound to the tissue protective cytokine receptor complex.

5. A method for identifying a compound that modulates a tissue protective activity, comprising:

(a) contacting a test compound with a tissue protective cytokine receptor complex-expressing cell; and

(b) measuring the level of tissue protective cytokine receptor complex activity in the cell;

(c) identifying a test compound which increases or decreases the tissue protective cytokine receptor complex activity as compared to the level of tissue protective cytokine receptor complex activity measured in the absence of the test compound; and

(d) assaying for the identified test compound for a tissue protective activity.

6. The method of Claim 5, wherein the tissue protective cytokine receptor complex activity is measured by a cell proliferation assay.

7. The method of Claim 5, wherein the cell is recombinantly engineered to express at least one EPO or β common receptors.

8. The method of Claim 7, wherein the cell endogenously expresses an EPO receptor and is transformed with a nucleic acid comprising a nucleotide sequence that (i) is operably linked to a promoter, and (ii) encodes a β common receptor polypeptide.

9. The method of Claim 7, wherein the cell endogenously expresses a β common receptor and is transformed with a nucleic acid comprising a nucleotide sequence that (i) is operably linked to a promoter, and (ii) encodes an EPO receptor polypeptide.

10. The method of Claim 8 or 9, wherein the nucleotide sequence is derived from the same species as the cell.

11. A method for identifying a compound that modulates a tissue protective activity, comprising:

(a) contacting a test compound with a cell which is recombinantly engineered to express an EPO receptor, wherein said cell is transformed with a nucleic acid comprising a nucleotide sequence that (i) is operably linked to a promoter, and (ii) encodes a β common receptor polypeptide;

(b) measuring the level of tissue protective cytokine receptor complex activity in the cell;

(c) identifying a test compound that increases or decreases the level of tissue protective cytokine receptor complex activity in the cell relative to the level of tissue protective cytokine receptor complex activity measured in a control cell,

wherein the control cell is of the same cell type as the cell of step (a) and is not transformed with a nucleic acid comprising a nucleotide sequence that (i) is operably linked to a promoter, and (ii) encodes a β common receptor polypeptide; and

(d) assaying the identified test compound for a tissue protective activity.

12. A method for identifying a compound that modulates a tissue protective activity, comprising:

(a) contacting a test compound with a recombinant cell that expresses a β common receptor, wherein said cell is transformed with a nucleic acid comprising a nucleotide sequence that (i) is operably linked to a promoter, and (ii) encodes a EPO receptor polypeptide;

(b) measuring the level of tissue protective cytokine receptor complex activity in the cell;

(c) identifying a test compound that increases or decreases the level of tissue protective cytokine receptor complex activity in the cell relative to the level of tissue protective cytokine receptor complex activity measured in a control cell, wherein the control cell is of the same cell type as the cell of step (a) and is not transformed with a nucleic acid comprising a nucleotide sequence that (i) is operably linked to a promoter, and (ii) encodes a β common receptor polypeptide; and

(d) assaying the identified test compound for a tissue protective activity.

13. A method for identifying a compound that modulates a tissue protective activity, comprising:

(a) contacting a test compound with a tissue protective cytokine receptor complex-expressing cell, wherein said cell is transformed with a nucleic acid comprising a nucleotide sequence that encodes a reporter gene operably linked to a regulatory element associated with a tissue protective cytokine receptor complex activity;

(b) identifying a test compound that increases or decreases the level of reporter gene expression relative to the level of reporter gene expression measured in the absence of the test compound, and

(c) assaying the identified test compound for a tissue protective activity.

14. The method of Claim 13, wherein the regulatory element is a serum response element.

15. A method of identifying a compound that modulates a tissue protective activity, comprising:

(a) contacting a test compound with a cell comprising:

(i) a nucleic acid sequence comprising a reporter gene operably liked to a binding site specific for a DNA binding domain of a transcriptional activator;

(ii) a first fusion protein comprising (A) the DNA binding domain of the transcriptional activator, and (B) a first tissue protective cytokine receptor polypeptide or a fragment thereof; and

(iii) a second fusion protein comprising (A) an activation domain of the transcriptional activator and (B) a second tissue protective cytokine receptor,

(b) detecting reporter gene expression,

such that if the reporter gene expression in (b) differs relative to the reporter gene expression detected in the absence of the test compound, a compound that modulates a tissue protective activity is identified.

16. The method of any one of Claims 5, 11, 12, 13, or 15, wherein the cell is a prokaryotic cell.

17. The method of any one of Claims 5, 11, 12, 13, or 15, wherein the cell is a eukaryotic cell.

18. The method of Claim 17, wherein the eukaryotic cell is a human cell.

19. The method of any one of Claims 5, 11, 12, 13, or 15, wherein the cell endogenously expresses at least one receptor of the tissue protective cytokine receptor complex.

20. The method of any one of Claims 5, 11, 12, 13, or 15, wherein the cell is a BaF3 cell.

21. A method of identifying a compound that modulates the activity of a tissue protective cytokine receptor complex, said method comprising:

(a) contacting a test compound with a cell of a modified yeast strain containing (i) a nucleotide sequence encoding a reporter gene that is operably linked to a tissue protective cytokine receptor complex-responsive promoter and (ii) expresses a tissue protective cytokine receptor complex; and

(b) determining the level of activity of a tissue protective cytokine receptor complex by measuring the level of reporter gene expression,

such that if the level of reporter gene activity in the presence of the compound increases or decreases relative to the level of reporter gene activity in the absence of the compound, then a compound that modulates the activity of a tissue protective cytokine receptor complex is identified.

22. A method for identifying a compound that binds to a tissue protective cytokine receptor complex, comprising:

(a) contacting a tissue protective cytokine receptor complex with (i) a tissue protective cytokine receptor complex ligand attached to a first label and (ii) an equivalent amount of a test compound attached to a second label under conditions conducive to binding;

(b) removing unbound material from the tissue protective cytokine receptor complex; and

(c) detecting the level of the first and second labels wherein if the second label is present the compound binds the complex and if the level of the first label decreases relative to the level of the first label where the labeled ligand is contacted with a tissue protective cytokine receptor complex under conditions conducive to binding in the absence of a test compound after removal of unbound material,

then a compound that binds to a tissue protective cytokine receptor complex y is identified.

23. A method for identifying a compound that modulates the binding of a tissue protective cytokine receptor complex ligand to a tissue protective cytokine receptor complex, comprising:

(a) contacting a tissue protective cytokine receptor complex ligand with a tissue protective cytokine receptor complex in the presence of one or more test compounds under conditions conducive to binding; and

(b) measuring the amount of tissue protective cytokine receptor complex ligand bound to the tissue protective cytokine receptor complex;

such that if the amount of bound tissue protective cytokine receptor complex ligand measured in (b) differs from the amount of bound tissue protective cytokine receptor complex ligand measured in the absence of the one or more test compounds, then a compound that modulates the binding of a tissue protective cytokine receptor complex ligand to the tissue protective cytokine receptor complex is identified.

24. The method of Claim 23, wherein the amount of bound tissue protective cytokine receptor complex ligand is measured using a tissue protective cytokine receptor complex ligand-specific antibody.

25. The method of Claim 23, wherein the tissue protective cytokine receptor complex ligand is labeled and binding of the tissue protective cytokine receptor complex ligand to the tissue protective cytokine receptor complex is measured by detecting the label attached to the tissue protective cytokine receptor complex ligand.

26. The method of any one of Claim 23, wherein the tissue protective cytokine receptor complex ligand is labeled and binding of the labeled ligand to the tissue protective cytokine receptor complex is measured by detecting the label attached to the tissue protective cytokine receptor complex ligand.

27. The method of Claim 24, wherein the label is fluorescent.

28. A method for identifying a compound that modulates the interaction between a tissue protective cytokine receptor complex and a tissue protective cytokine receptor complex ligand, comprising:

(a) contacting a tissue protective cytokine receptor complex with one or more test compounds; and

(b) measuring the tissue protective cytokine receptor complex activity,

such that if the activity measured in (b) differs from the tissue protective cytokine receptor complex activity in the absence of the one or more test compounds, then a compound that modulates the interaction between the tissue protective cytokine receptor complex and the tissue protective cytokine receptor complex ligand is identified.

29. The method of any one of Claims 1, 5, 11, 12, or 28, wherein the tissue protective cytokine receptor complex activity is measured by cell proliferation or cell differentiation.

30. The method of any one of Claims 1, 5, 11, 12, or 28, wherein the tissue protective cytokine receptor complex activity measured is the ability of the tissue protective cytokine receptor complex to interact with a tissue protective cytokine receptor complex ligand.

31. The method of any one of Claims 1, 5, 11, 12, 13, 22, or 28, wherein the step of assaying the identified compound for tissue protective activity comprises detecting the presence of nucleolin in the cell.

32. The method of any one of Claims 1, 5, 11, 12, 13, 22, or 28, wherein the step of assaying the identified compound for tissue protective activity comprises detecting or measuring an increased level of activity of neuroglobin or cytoglobin in a cell.

33. The method of any one of Claims 1, 22, 23, or 28, wherein the tissue protective cytokine receptor complex is in solution.

34. The method of any one of Claims 1, 22, 23, or 28, wherein the tissue protective cytokine receptor complex is in a cell.

35. The method of Claim 23, or 28, wherein the compound inhibits the binding of a tissue protective cytokine receptor complex ligand to a tissue protective cytokine receptor complex.

36. The method of Claim 23, or 28, wherein the compound enhances the binding of a tissue protective cytokine receptor complex ligand to a tissue protective cytokine receptor complex.

37. The method of any one of Claims 1, 22, 23, or 28, wherein the tissue protective cytokine receptor complex contacted in step (a) is on a cell surface.

38. The method of any one of Claims 1, 22, 23, or 28, wherein the tissue protective cytokine receptor complex is on an isolated cell membrane.

39. The method of any one of Claims 1, 22, 23, or 28, wherein the tissue protective cytokine receptor complex is immobilized to a solid surface.

40. The method of Claim 39, wherein the solid surface is a microtiter dish.

41. The method of Claim 39, wherein the solid surface is a chip.

42. A method for identifying a compound that binds a tissue protective cytokine receptor complex, comprising:

(a) contacting a test compound with a ligand-binding tissue protective receptor complex fragment comprising at least one EPO receptor extracellular domain and at least one β common receptor extracellular domain fused to an F_c fragment attached to a solid support; and

(b) removing unbound test compounds from the solid support;

(c) identifying the compound attached to the tissue protective cytokine receptor complex fragment,

such that a compound bound to the solid support is identified as a compound that binds to a tissue protective cytokine receptor complex.

43. The method of any one of Claims 1, 5, 11, 12, 13, 15, 16, 22, 23, 28, or 42, wherein the test compound is an antibody specific for the tissue protective cytokine receptor complex.

44. The method of any one of Claims 16, 22, 23, 28, or 42, wherein the test compound is an antibody is specific for a tissue protective cytokine receptor complex ligand.

45. The method of any one of Claims 1, 5, 11, 12, 13, 15, 16, 22, 23, 28, or 42, wherein the test compound is a small molecule.

46. The method of any one of Claims 1, 5, 11, 12, 13, 15, 16, 22, 23, 28, or 42, wherein the test compound is a peptide.

47. The method of any one of Claims 1, 5, 11, 12, 13, 15, 16, 22, 23, 28, or 42, wherein the test compound is a member of a library.

48. The method of any one of Claims 16, 22, 23, 28, or 42, wherein the tissue protective cytokine receptor complex ligand is an EPO.

49. The method of any one of Claims 1, 5, 11, 12, 13, 28, or 42, wherein the compound binds the tissue protective cytokine receptor complex.

50. The method of any one of Claims 16, 23, 28, or 42, wherein the compound binds the tissue protective cytokine receptor complex ligand.